

The Giant Amazonian Snail (Pulmonata: Acavidae) Beats Them All

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Abstract. *Pebasiconcha immanis* gen. & sp. nov. is described from the Miocene Pebas Formation of Colombian Amazonia. Apart from a simple outer lip of the aperture and a prominent external "mytiloid" thickening shortly below the suture, behind the lip, the genus resembles *Strophocheilus*. It is the largest terrestrial gastropod now known to have ever existed, and one of only two species of terrestrial snails recorded from the Pebas Formation. Its shells are approx. 20% higher than those of the largest Achatinidae known.

INTRODUCTION

Species of the Achatinidae are generally considered the largest terrestrial snails that ever lived on earth. That gastropod family, including the Giant African Snails of popular writing, is restricted to tropical Africa. Their fusiform shells may reach approx. 21 cm in height. South American species of the Acavidae, Strophocheilinae, have long been second on the world list, with similar shells up to 16 cm high.

During fieldwork in deposits of the Miocene Pebas Formation in Colombian Amazonia, in the autumn of 1991, some remarkably large shells of snails were found. These shells, locally common in the formation, were initially classified with the genus *Strophocheilus* Spix, 1827 (Pulmonata: Acavidae: Strophocheilinae); later, it was observed that they differ in apertural characters, however. The working conditions did not permit the transport of complete shells (that were broken into pieces and disintegrated), but photographs were made of an entire specimen *in situ*. A second visit to the area in 1996 yielded only additional shell fragments. On this visit, however, in a shop in Iquitos, Peru, though not for sale, a single well-preserved specimen was discovered; this shell could also be photographed. Therefore, the current description of a new genus and species is based on photographs and shell fragments.

The species is one of only two terrestrial pulmonate species recorded from the Miocene Pebas Formation, which is rich in fresh- and brackish-water mollusks. It is truly giant in size. The maximal height of the fusiform shell, directly observed, is 25.6 cm; on the basis of shell fragments, similar dimensions can be calculated. This dis-

covery implies a 20% increase in the maximum shell size known for terrestrial snails, dethroning the Giant African Snails in favor of this "Giant Amazonian Snail."

SYSTEMATIC PALEONTOLOGY

Class Gastropoda

Order Stylommatophora A. Schmidt, 1855

Family ACAVIDAE Pilsbry, 1895

Subfamily STROPHOCHEILINAE Thiele, 1926

Pebasiconcha immanis Wesselingh & Gittenberger gen. & sp. nov.

(Figures 1, 2)

Holotype (Figure 1a): a shell, complete when collected but secondarily broken into pieces (Instituto de Investigaciones en Geociencias, Minería y Química ["Ingeominas"], Bogotá, Colombia, unnumbered).

Paratypes: Nineteen shell fragments from the type locality and type stratum (Figure 2a, b) (Nationaal Natuurhistorisch Museum, Leiden, The Netherlands - RGM 394327/30); a complete shell from locality 2 (Figure 1b,c) (M. Callegari, private collection, Iquitos, Peru).

Type locality and locality 2: The holotype was found September 1991 by the first author in Colombia, State of Amazonas, in the cliff at the northern side of the confluence of the rivers Amazonas and Loreto-Yacu, 1 m above the water table. The locus typicus is in the Pebas Formation, and is assigned to a late Middle to early Late Miocene age (*Grimsdalea* zone) (Hoorn, 1994). Locality

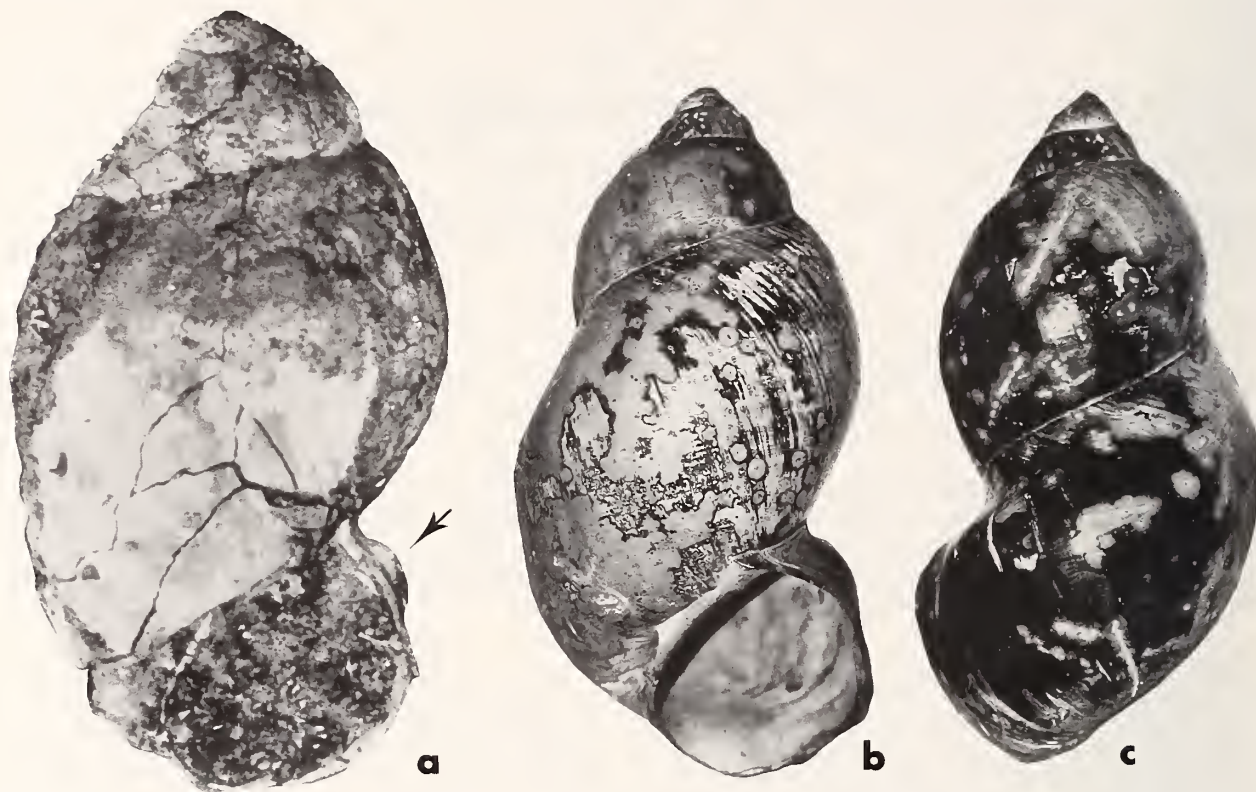


Figure 1

Pebasiconcha immanis Wesselingh & Gittenberger gen. & sp. nov. a. holotype [height 25.6 cm] (irreparably broken after the photograph had been taken in the field), with the "mytiloid" knob indicated by an arrow ("Ingeominas" Collection, Bogotá, Colombia, unnumbered). b-c. paratype [height 21.9 cm] from the vicinity of Pebas, Loreto department, Peru (M. Callegari private collection, Iquitos, Peru, unnumbered). Photos: F. Wesselingh.

2 cannot be indicated more exactly than "vicinity of" Pebas, Loreto department, Peru; outcrops from that area have been assigned to a Middle Miocene age (*Crassoretitriletus* zone) (Hoorn, 1994).

Diagnosis: Shell very large, reaching over 25 cm in height; body whorl with a markedly constricted aperture; apertural lip neither thickened nor reflected; upper half of the body whorl, shortly behind the apertural lip, with a conspicuous knob, accompanied more posteriorly by a less prominent swelling.

Description: The ovoid shell has up to nearly six moderately convex whorls, separated by a suture, which becomes more strongly indented toward the aperture. The body whorl measures approx. four-fifths of and the aperture approx. one-third of the total shell height; it is slightly more flattened than the preceding whorls. The protoconch sculpture is unknown because the initial whorls are abraded or dissolved in all specimens. The teleoconch has irregular prosocline riblets that are most prominent at the apical side of the whorls. The penultimate whorl has about 170 such riblets. In between them,

small malleated areas may occur, in particular on fragments with a weakly developed sculpture. On most of the body whorl the riblets are more or less obsolete, and the surface is somewhat malleated. There is a prominent, asymmetrical knob (Figures 1a, 2b) on the upper half of the body whorl, shortly behind the apertural border. This knob has a well-defined, narrow tip shortly below the suture and a broadly rounded basal part; in curvature it is reminiscent of a *Mytilus* valve. Toward the back, there is a far more obsolete roundish knob. The final quarter of the body whorl has a concave shoulder which is increasingly more prominent toward the aperture (Figure 1c). The aperture is markedly constricted. Its outer lip is regularly curved and nearly circular, with the border neither reflected nor thickened. The inner lip is straightened, with a relatively thin parieto-columellar callus. The umbilicus is closed or slitlike; in some specimens a damaged, very narrow columellar canal is visible.

Several fragments and the complete paratype bear irregularly arranged low ridges on the ultimate and the penultimate whorls. On the lower half of the whorls these ridges are spirally arranged, whereas on the upper half



Figure 2

Pebasiconcha immanis Wesselingh & Gittenberger, gen. & sp. nov., paratypes from the type locality & type stratum. a. apical fragment, RGM 394328. b. upper palatal wall fragment, with the "mytiloid knob," RGM 394329. G. A. Peeters del.

they converge obliquely toward the periphery. Some fragments have a brownish layer, possibly a remnant of the periostracum.

Dimensions: The holotype suffered severely from transport. Because it had been photographed before, however, its size could be calculated as approx. 25.6 cm high and 14.5 cm broad; the aperture, measured outside, in frontal view, is 8.7 cm high and 8.2 cm broad. The locality 2 paratype measures 21.9 × 11.8 cm; its aperture is 7.0 cm high and equally broad. An apical fragment (RGM 394328; Figure 2a) is similar to the holotype in size. A fragment of the palatal apertural wall, with the “mytiloid” knob included (Figure 2b), is either of a specimen higher than 30 cm, or of a shell with a relatively large knob as compared to the holotype.

Recently, Dr. A. J. de Winter (Nationaal Natuurhistorisch Museum, Leiden) bought a shell of *Archachatina marginata* (Swainson, 1821), measuring 21.3 × 12.4 cm, from a villager at Nyangong, SW. Cameroun (De Winter, 1997). According to Dr. A. Mead (1961, and in litt., 24 April 1995), this specimen is larger than any shells of Giant African Snails recorded in his personal database; the shell is slightly aberrant in shape, however, which might be indicative of abnormal growth. A single shell of *Achatina achatina* (Linnaeus, 1758) is reported by Parkinson et al. (1987:33), as “one exceptional specimen” of 27.3 cm, of this well-known species, normally measuring “up to 20 cm” only. Because of the magnitude of the difference in size with specimens hitherto reported, we prefer to consider this specimen an aberration, not to be considered in the regular species description. The “Giant Amazonian Snail,” known from far fewer specimens, is considerably larger than the Giant African Snails.

Classification and differentiation: The assignment of this species to the Acauidae, Strophocheilinae, is based on the size, shape, and sculpture of the shell, in particular the proscloine riblets at the apical side of the whorls, and its occurrence in Amazonia. Without anatomical data, this assignment has to remain poorly based. The closest relatives of this species might also be found among the Bulimulidae or the Orthalicidae, mainly differing conchologically by somewhat lower maxima in shell size (Zilch, 1960).

The genus *Strophocheilus* Spix, 1827, is known from the neotropical region only, from the Paleocene on (Parodiz, 1969; Zilch, 1960). *Pebasiconcha immanis* differs from all *Strophocheilus* species by its very large size and particularly by the simple outer lip of the aperture and the “mytiloid” knob on the body whorl, shortly behind the lip. In *Strophocheilus* the straight outer lip is always clearly thickened, a generic autapomorphy, and the surface of the body whorl is not provided with any knobs. The simple outer lip in *Pebasiconcha*, found in many gastropod shells, may be considered a plesiomorphous

character state (if not a reversal), whereas giant size and “mytiloid” knob are seen as autapomorphies.

Habitat: The Pebas Formation has been deposited in a fluvio-lacustrine to permanently lacustrine palaeo-environment (Hoorn, 1994). The deposits are rich in aquatic mollusks, i.e., cochliopine hydrobiids and pachydontine corbulids. Forty-four species are now known from these deposits (Nuttall, 1990). Despite predominantly lacustrine conditions in western Amazonia during the Middle Miocene, swamplike conditions and forested riverbanks must also have been present (Hoorn, 1994). Therefore, the number of only two terrestrial gastropod species, both pulmonates, *P. immanis* and *Orthalicus linteus* (Conrad, 1871) is remarkably low. The latter species probably lived on tree trunks and branches, the habitat occupied by the many congeneric Recent species. *Pebasiconcha immanis* might have lived on the humid bottom, where gravity is less problematic; it seems unlikely that such huge snails would have climbed trees.

In outcrops of the Pebas Formation, concentrates of severely damaged specimens and fragments of *P. immanis* are common. Smaller, more clearly abraded fragments can be found dispersed throughout the deposits. The concentrates are often part of lignitic lags. At the type locality there are two such lags, overlain there by incursion layers containing abundant mangrove pollen, foraminifera, and marine gastropods. The poor internal sorting of these lags and the preservation of delicate structures on some of the shell fragments (RGM 394327) indicate a rapid deposition without much reworking, suggesting marine incursions in a fluvio-lacustrine environment. For other lags with concentrates of *P. immanis* no relation with incursion events is seen.

Etymology: Generic name after the Pebas Formation and *concha*, Latin for shell. Epithet *immanis*, Latin for enormous, huge, etc.

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